

Claims

What is claimed is:

1. A power system comprising:
an electric motor being operable to power a hydraulic pump;
at least one hydraulic cylinder being fluidly connected to the hydraulic pump and defining a first fluid volume and a second fluid volume separated from one another via a moveable plunger;
a fluid driven rotating device being fluidly connected to at least the first fluid volume defined by the hydraulic cylinder and being operable to power a generator; and
a power storage system including at least one of a battery and a capacitor being in electrical communication with the generator and the electric motor.
2. The power system of claim 1 including an inverter being positioned between the electric motor and at least one of the capacitor and battery.
3. The power system of claim 1 wherein the fluid driven rotating device includes a variable displacement hydraulic motor.
4. The power system of claim 3 including an inverter being positioned between the electric motor and at least one of the capacitor and the battery.
5. A work machine comprising a work machine body; and
the power system of claim 1 being attached to the work machine body.

6. The work machine of claim 5 including an implement attached to the work machine body; and
the at least one hydraulic cylinder being operably coupled to move the implement.

7. A power system, comprising:
means for converting hydraulic power produced within at least one hydraulic cylinder to mechanical power;
means for converting the mechanical power to electrical power;
means for storing the electrical power in at least one of a battery and a capacitor;
means for supplying an electric motor coupled to the hydraulic pump with the electrical power from at least one of the battery and the capacitor;
and
means for supplying hydraulic fluid, via the hydraulic pump, to the at least one hydraulic cylinder.

8. The power system of claim 7 wherein the means for converting hydraulic power to mechanical power includes a variable displacement hydraulic motor.

9. The power system of claim 7 wherein means for supplying the electrical power includes an inverter.

10. The power system of claim 7 wherein the at least one hydraulic cylinder being operably coupled to move a work machine implement.

11. A method of operating an electrical power system, comprising the steps of:
powering a generator, at least in part, by converting hydraulic power created within a hydraulic cylinder to mechanical power;

storing electrical power created by the generator in at least one of a battery and a capacitor;

powering a hydraulic pump, at least in part, by supplying electrical power from at least one of the battery and capacitor to an electric motor coupled to the hydraulic pump; and

supplying hydraulic fluid to the hydraulic cylinder, at least in part, by operating the hydraulic pump.

12. The method of claim 11 wherein the step of powering the generator includes a step of attaching a variable displacement hydraulic motor to the generator.

13. The method of claim 11 wherein the step of powering the generator includes a step of producing hydraulic power by retracting a plunger within a hydraulic cylinder.

14. The method of claim 13 wherein the step of producing hydraulic power includes a step of controlling a speed of the retracting plunger, at least in part, by varying the displacement of the motor.

15. The method of claim 11 wherein the step of powering a hydraulic pump includes a step of inverting electrical current being supplied from at least one of the capacitor and the battery to the electric motor.

16. A power system comprising:
at least one of a battery and a capacitor being configured to supply stored electrical power to an electric motor;
a hydraulic pump being configured to be powered by the electric motor;
a hydraulic cylinder being configured to receive hydraulic fluid from the hydraulic pump;

a fluid driven rotating device being configured to be powered by hydraulic power produced within the hydraulic cylinder; and

a generator being configured to be powered by the fluid driven rotating device and to supply electrical power to at least one of the battery and the capacitor.

17. The power system of claim 16 including an inverter configured to invert the electrical power being supplied from the at least one battery and capacitor to the electric motor.

18. The power system of claim 16 wherein the fluid driven rotating device includes a variable displacement hydraulic motor.